

Taxonomic Study of Korean Cantharidae (Coleoptera) I. Silinae, Malthininae, and Chauliognathinae

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Abstract In this review of the Korean Cantharidae, three subfamilies (Silinae, Malthininae, and Chauliognathinae), are reviewed, with a description of a new species, *Malthinus quadratipennis* n. sp., and new records of *Silis triimpressa* Pic of Silinae and *Malthinellus bicolor* Kiesenwetter of Malthininae. *Tryptherus niponicus* (Lewis) of Chauliognathinae known without any diagnosis in Korea, was given a redescription based on Korean specimens. A key to the Korean subfamilies of the Cantharidae, and photos of species and their collecting localities are provided.

Key words Coleoptera, Cantharidae, Silinae, Malthininae, Chauliognathinae, Korea, taxonomy

INTRODUCTION

The family Cantharidae (Coleoptera, Cantharoidea) which was established by Imhoff (1856) has been divided into five subfamilies; Cantharinae, Silinae, Malthininae, Dysmorphocerinae, and Chauliognathinae (Brancucci, 1980), comprising more than 5,000 species belonging to about 130 genera in the world (Booth *et al.*, 1990). Korean Cantharidae, since Heyden (1887) reported four species of three genera for the first time from Korea, were known with 32 species belonging to nine genera of the two subfamilies, Cantharinae and Chauliognathinae. But most of these species were reported from various faunistic surveys by non-specialists, therefore several genera and species were erroneously recorded due to the misidentification. Especially, genera of *Cantharis*-complex have often made serious confusions because of their similarity, and several scientific names were abused. Thus, in this study, authors tried to correct the errors on the Korean cantharids, which were made by the previous workers.

In the study, three subfamilies; Chauliognathinae and newly known two subfamilies, Silinae and Malthininae, were reviewed. The subfamily Chauliognathinae was known with one species, *Tryptherus niponicus* (Lewis), and authors redescribed it based on Korean samples. Also Silinae was examined with one species, *Silis triimpressa* Pic., and Malthininae was reviewed with two species of the two genera, *Malthinus quadratipennis* n. sp. and *Malthinellus bicolor* Kiesenwetter. Diagnosis of each subfamilies and genera are provided. Also, the description for a new species and the redescription for two

unrecorded species are given.

A total of 31 specimens examined are mainly preserved in the collections of Sungshin University and some in Agriculture of Seoul National University. The photographs are taken with the stereomicroscope (LEICA MZ APO zoom). Abbreviations used for provinces are as follows: Gangwondo (GW), Gyeonggido (GG), Seoul (GS), Chungcheongnamdo (CN), Gyeongsangbukdo (GB), Cheollabukdo (JB).

SYSTEMATICS

Family Cantharidae

Imhoff, Vers. Einf hr. Stud. Kol., Basel, 31: 69, 1856.

Diagnosis. Body length 2–30 mm. Body color yellow, red or black, rarely metallic. Antennae usually filiform, serrate, or pectinated, rarely clubbed. Head prognathous, semi-hypognathous, or hypognathous, mandibles sickle-shaped. Eyes round, prominent. Maxillary and labial palpi variable, but apical segment mainly hatchet-like or cylindrical. Pronotum flat, with distinct side margins. Scutellum small. Elytra flat, rarely costate, without apical declivity, sometimes shortened to expose hind wings, confusedly punctate. Epipleura narrowed. Suture between metasternum and metepisternum S-shaped. Abdomen with 7 sternites. Procoxae conical, procoxal cavities widely open behind. Mesocoxae contiguous. Tarsal formula 5–5–5, 4th segment lobed. Apical tibial spurs short or absent.

Key to the Korean subfamilies of the Cantharidae

1. Tibia with strong apical spur. Last segment of sternite and aedeagus symmetry. Hind wing not exposed or slightly exposed behind elytra 2
 - Tibia without apical spur. Last segment of sternite and aedeagus asymmetry. Hind wing exposed of 2/3 behind elytra Chauliognathinae
2. Abdominal spiracles small and indistinct. Pronotum without process 3
 - Abdominal spiracles large and distinct. Pronotum with a process at lateral margin Silinae
3. Last segment of maxillary palpi cylindrical with sharp apex. Hind wing slightly exposed behind elytra. Malthininae
 - Last segment of maxillary palpi hatchet-like. Hind wing not exposed behind elytra Cantharinae

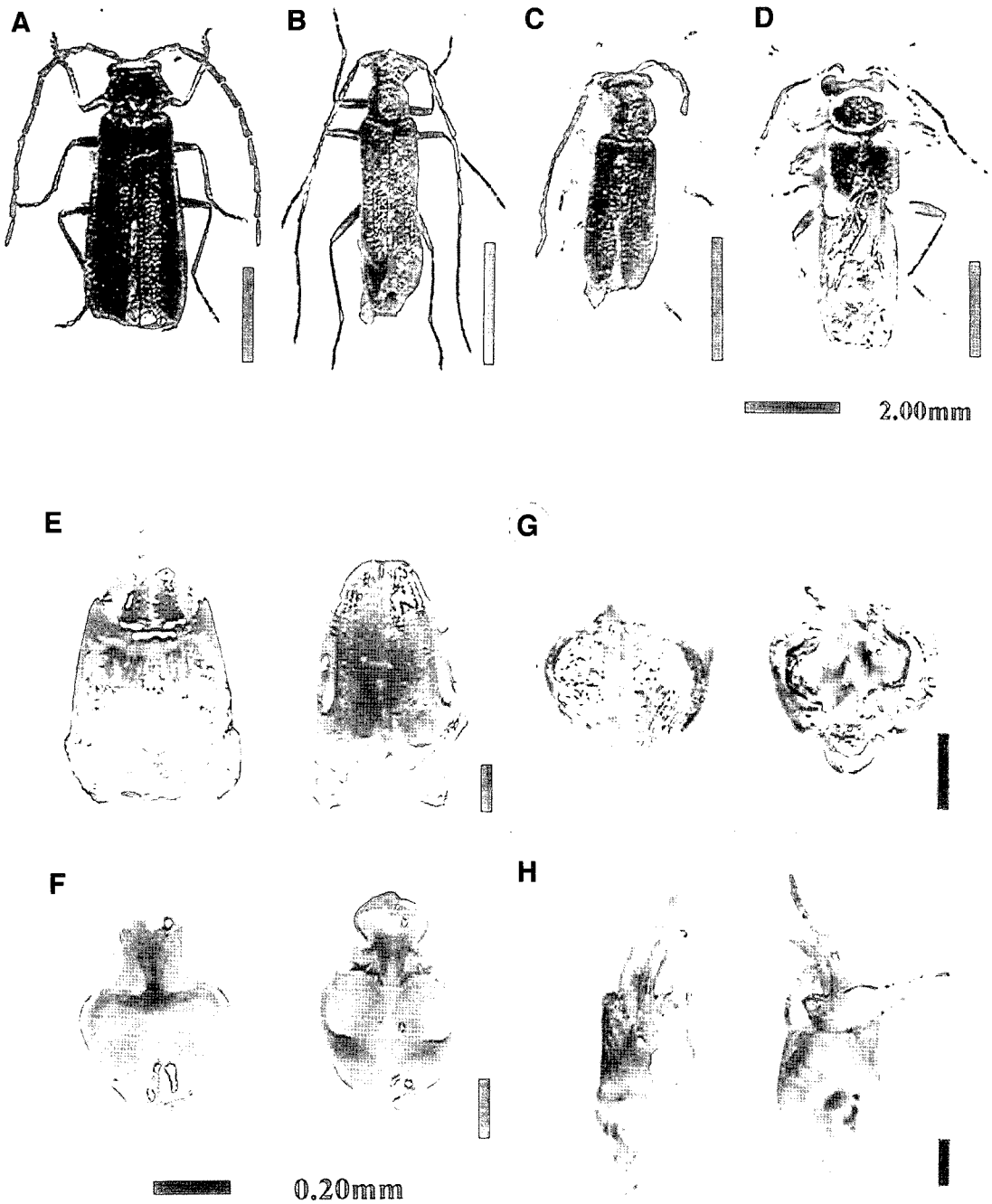
Subfamily Silinae

Mulsant, Hist. nat. Col. Fr. Mollip.: 131, 342, 1862. Type genus: *Silis* Charpentier, 1825

Silini: Mulsant, Hist. nat. Col. Fr. Mollip.: 131, 342, 1862; Delkeskamp, Dr W. Junk bv Publishers, the Hague: 216, 1977.

Silinae: Brancucci, Ent. Basiliensia 5: 289, 1980; Wittmer, Ent. Rev. Japan 37(2): 121, 1982.

Diagnosis. Body color various, rarely metallic. Head prognathous, slightly round. Gular sutures widely



Figs A-D. Male adults: A, *Silis triimpressa* Pic; B, *Malthinus quadratipennis* sp. nov.; C, *Malthinellus bicolor* Kiesenwetter; D, *Trypherus niponicus* (Lewis). (Scales: 2 mm)

Figs E-H. Aedeagus: E, *Silis triimpressa* Pic; F, *Malthinus quadratipennis* sp. nov.; G, *Malthinellus bicolor* Kiesenwetter; H, *Trypherus niponicus* (Lewis). (Scales: 0.2 mm)

separated. Eye slightly convex. Antennae filiform, lobed, or pectinated. Fourth segment of maxillary palpi hatchet-like. Pronotum flat, semi-circulated. Posterior angles of pronotum with strong processes. Elytra long and covered. Hind wing not exposed behind elytra. Abdominal spiracles large and distinct. Last segment of sternite and aedeagus symmetry. Tibia with apical spurs.

Tribe Silini

Mulsant. Hist. nat. Col. Fr. Mollip.: 131, 342, 1862.

Genus *Silis* Charpentier, 1825

Horae ent.: 194. Type species: *Cantharis nitidula* Fabricius, 1792.

Diagnosis. Pronotum glabrous at anterior half, without distinct pores; male apical abdominal circle consisting of almost equally wide sternite and tergite; apical abdominal sternite in female semicircularly cut, apical tergite with pronounced angles; all outer claws with blunt tooth at basal part in male, but all tarsal claws simple in female.

Silis triimpressa Pic, 1926

(Figs A, E)

Echange 42: 1.

Redescription. Body length 6–8 mm (Elytral shoulder : Length = 1.00 : 4.10). Body color black.

Male. Head, pronotum, scutellum, and elytra black; leg black, but fore tibia yellow, mid and hind femoro-tibial joint yellow. Head flat, with thin and minute puncturing, with strong transverse depression behind antennal socket. Eye relatively small, ratio of eye diameter to intereye distance 1.00 : 3.73. Antennae relatively long, nearly same to body length, ratio of antennal segment 1.00 (2nd) : 2.50 : 3.50 : 3.75 : 4.13 : 4.00 : 4.00 : 3.63 : 3.38 : 3.63. Last segment of maxillary palpi hatchet-like, 2.14 times longer than third segment, 1.67 times longer than second segment; last segment of labial palpi hatchet-like. Pronotum width 1.47 times wider than length; glabrous subcirculated, with thin and minute puncturing; posterior margin with two strong triangular depression; hind corner with sharpened process. Scutellum triangular, with round apex. Elytra parallel-side, ratio of width at elytral shoulder to length of elytra 1.00 : 3.00. Leg long and slender; all outer tarsal claws with blunt tooth at basal part. Aedeagus (Fig. E) subquadrated, length 1.15 times longer than width; dorsal plate not divided at posterior margin; dorsal process exposed behind posterior margin of dorsal plate; ventral process strongly expanded, but slightly narrowed to posteriorly.

Female. Similar to male, but with wider body, shorter antennae; pronotum without process; all tarsal claws simple.

Material examined. (19ex) GW– 6 ♂, 5 ♀, Mt. Taebaek, 30. V. 1999; 1 ♀, Mt. Bangtae, Inje, 4–6. VI. 1999. GS– 1 ♀, Gwangleung, Namyangju, 13. V. 1994; 1 ♀, Mt. Chukryeong, 1. V. 1999; 1 ♀, Namhansanseong, Seongnam, 26. VII. 1974; 1 ♀, Temple Yongmunsa, Mt. Yongmun, Yangpyeong, 3. V. 1998. GB– 1 ♀, Velley Huibanggyegok, Mt. Sobaek, 28. V. 1999. JB– 1 ♂, Samgong, Muju, 24. V.

1994; 1 ♀, Gucheondong, Muju, 21. V. 1983.

Distribution. Korea (new record) and Siberia Maritime Territory

Remark. The species is newly recorded from Korea. This species is distinguished from the allies by the shape of pronotum and the strong process at posterior angle of pronotum.

Subfamily Malthininae

Kiesenwetter, Linn. Ent. 7: 239, 1852. Type genus: *Malthinus* Latreille, 1806.

Malthinini: Kiesenwetter, Linn. Ent. 7: 239, 1852; Delkeskamp, Dr W. Junk bv Publishers, the Hague: 321, 1977.

Malthininae: Brancucci, Ent. Basiliensia 5: 294, 1980; Wittmer, Ent. Rev. Japan 37(2): 121, 1982.

Diagnosis. Body color yellowish brown to black. Head prognathous. Gular sutures widely separated, or converged. Eye slightly convex. Antennae filiform. Fourth segment of maxillary palpi round, or oval shaped with hairless sharp apex. Pronotum flat. Elytra often slightly short and uncovered abdomen. End of elytra with spots in some *Malthinus*. Hind wing slightly exposed behind elytra. Last segment of sternite and aedeagus symmetry. Tibia with apical spurs.

Key to the Korean species of the Malthininae

1. Antennae longer than body length. Elytra without strong punctures. Leg black *Malthinus quadratipennis* n. sp.
- Antennae shorter than body length. Elytra with strong punctures. Leg yellowish brown *Malthinellus bicolor* Kiesenwetter

Tribe Malthinini

Kiesenwetter, Linn. Ent. 7: 239, 1852

Genus *Malthinus* Latreille, 1806

Gen. Crust. Ins. 1: 261. Type species: *Cantharis flaveolus* Herbst, 1786

Diagnosis. Antennal segments relatively long; elytra without strong punctures; Hind wing slightly exposed behind elytra; all tarsal claws simple; dorsal plate of aedeagus well developed, expanded posteriorly.

Malthinus quadratipennis n. sp.

(Figs B, F)

Description. Body length 4–6 mm (Elytral shoulder : Length = 1.00 : 4.38). Body color black.

Male. Head, pronotum, scutellum, elytra, and leg black. Head flat, with dense and minute puncturing,

with weak transverse depression. Eye relatively small, ratio of eye diameter to intereye distance 1.00 : 4.13. Antennae relatively long and slender, nearly 1.5 times longer than body length, ratio of antennal segment 1.00 (2nd) : 1.44 : 1.81 : 2.06 : 2.06 : 2.06 : 1.88 : 1.88 : 1.69 : 1.81. Last segment of maxillary palpi oval shaped with sharp apex, 1.67 times longer than third segment, 1.10 times shorter than second segment; last segment of labial palpi oval shaped with sharp apex. Pronotum. width 1.19 times wider than length; anterior width 1.15 times narrower than posterior width; subquadrated, with dense and minute puncturing; median plate with weak depression to posteriorly; side margin slightly sinuated, with round anterior corner and obtusely angulated hind corner. Scutellum triangular with round apex. Elytra parallel-side, ratio of width at elytral shoulder to length of elytra 1.00 : 3.08. Hind wing slightly exposed behind elytra. Leg long and slender; all tarsal claws simple. Aedeagus (Fig. F) subquadrated, length 1.19 times longer than width; dorsal plate not divided at posterior margin; posterior margin expanded to posteriorly; ventral process sharply expanded to posteriorly, with round end.

Female. Similar to male, but body slightly wider; antennae shorter than body length; eyes less convex.

Holotype. GG- 1 ♂, Mt. Chukryeong, Sudong-myeon, Namyangju, Korea, 6. VI. – 4. X. 1999.

Paratypes. 1 ♂, same data as holotype. GW- 2 ♂, Mt. Odae, Pyeongchang, Korea, 24. VI. 1998. GS- 1 ♂, Mt. Gwanggyo, Suweon, Korea, 18. V. 1992; 1 ♂, Mt. Cheonggye, Seocho, Seoul, Korea, 11. V. 1992; 1 ♂, Mt. Surak, Noweon, Korea, 30. V. 1998; 1 ♂, Mt. Gwanak, Gwanak, Korea, 6. VI. 1994. CN- 1 ♀, Mt. Mansu, Buyeo, Korea, 12. V. 1999.

Ethymology. The scientific name is based on the shape of aedeagus, and derived from the combination of quadra and pennis.

Distribution. Korea.

Remark. The species is very similar to Japanese species, *M. kobensis* and *M. okinawanus*, but it is easily distinguished by the spots of elytra and dorsal plate of aedeagus.

Genus *Malthinellus* Kiesenwetter, 1874

Berl. ent. Zeitschr. 18: 280. Type species: *Malthinellus bicolor* Kiesenwetter, 1874

Diagnosis. Antennal segments relatively short; elytra with strong punctures; hind wing slightly exposed behind elytra; all tarsal claws simple; dorsal plate of aedeagus less developed, not expanded posteriorly.

***Malthinellus bicolor* Kiesenwetter, 1874**

(Figs C, G)

Berl. Ent. Zeitschr. 18: 281

Redescription. Body length 4 mm (Elytral shoulder : Length = 1.00 : 3.64). Body color black.

Male. Head black, anterior part of antennal socket yellowish brown; pronotum, scutellum, and elytra black; leg yellowish brown. Head flat, with thin and minute puncturing. Eye relatively small, ratio of eye diameter to intereye distance 1.00 : 4.17. Antennae relatively long, nearly reaching 2/3 of elytra, ratio of antennal segment 1.00 (2nd) : 1.20 : 1.50 : 1.50 : 1.50 : 1.50 : 1.50 : 1.40 : 1.40 : 1.90. Last segment of maxillary palpi oval shaped with sharp apex, 2.33 times longer than third segment, same

length to second segment; last segment of labial palpi oval shaped with sharp apex. Pronotum width 1.30 times wider than length; anterior width 1.13 times narrower than posterior width; subquadrate, with thin and minute puncturing; side margin slightly sinuate, with obtusely angulated corner. Scutellum triangular with round apex. Elytra parallel-side, but narrowed to posteriorly, with strongly punctures, ratio of width at elytral shoulder to length of elytra 1.00 : 2.45. Hind wing slightly exposed behind elytra. Leg long and slender; all tarsal claws simple. Aedeagus (Fig. G) subquadrate in outline, length 1.22 times shorter than width; dorsal plate not divided at slightly archform curved posterior margin; ventral process bent upward at middle area, with sharp end.

Female. Similar to male, but antennae slightly shorter and more slender; eyes slightly less convex; elytra with weaker punctures comparing to male.

Material examined. (2ex) GW- 2 ♂, Mt. Cheongok, Donghae-shi, 23. VIII. 1997.

Distribution. Korea (New record) and Japan.

Remark. The species is newly recorded from Korea. This species is distinguished from the allies by the color and the shape of pronotum, and the strong punctures of elytra.

Subfamily Chauliognathinae

LeConte, *Classif. Col. N. Amer.*: 186, 1861.

Chauliognathini: LeConte, *Classif. Col. N. Amer.*: 186, 1861.

Chauliognathinae: Champion, *Trans. ent. Soc. London*: 128-168, 1914; Arnett, *Beetles United States, Washington, fasc. 54*: 537, 538, 1963; Delkeskamp, Dr W. Junk bv Publishers, the Hague: 431, 1977; Brancucci, *Ent. Basiliensia* 5: 296, 1980; Wittmer, *Ent. Rev. Japan* 37(2): 121, 1982.

Chauliognathidae: Miskimen, *Col. Bull.* 15: 17-25, 1961.

Diagnosis. Body color various, rarely metallic. Head prognathous, semi-hypognathous, or hypognathous. Gular sutures widely separated, or converged. Eyes convex. Antennae filiform. Fourth segment of maxillary palpi elongated hatchet-like, or oval shaped with hairy stubby apex. Pronotum flat, quadrate. Elytra long and covered abdomen in tribe Chauliognathini, or very short and uncovered abdomen in tribe Ichthyurini. Last segment of sternite and aedeagus asymmetry. Tibial spurs absent.

Tribe Ichthyurini

Champion, *Trans. ent. Soc. London*: 128, 1915.

Genus *Trypherus* LeConte, 1851

Proc. Acad. Nat. Sci. Philad., 5: 346. Type species: *Malthinus latipennis* Germar, 1824.

Diagnosis. Elytra distinctly reduced. Last segment of sternite asymmetry. Mid-femur of male expanded to various shape. All tarsal claws with tooth at basal part. Aedeagus asymmetry.

***Tryptherus niponicus* (Lewis, 1879)**

(Figs D, H)

Ann. Mag. nat. Hist. 5(4): 463 (Ichthyurus)

Tryptherus niponicus : Kwon *et al.* (1996: 155).*Redescription.* Body length 6 mm (Elytral shoulder : Length = 1.00 : 4.27). Body color mainly black.

Male. Head yellow, but posterior head of eye black; pronotum black, except yellowish bordering; scutellum dark brown; elytra black, with yellowish bordering; leg yellowish brown. Head flat, with thin and minute puncturing. Eye relatively large, ratio of eye diameter to intereye distance 1.00 : 2.40. Antennae relatively short, nearly reaching end of elytra, ratio of antennal segment 1.00 (2nd) : 1.07 : 1.27 : 1.20 : 1.07 : 1.00 : 1.00 : 0.93 : 0.87 : 1.00. Last segment of maxillary palpi hatchet-like, 2.83 times longer than third segment, 2.13 times longer than second segment; last segment of labial palpi elongated fan-shaped. Pronotum width 1.24 times wider than length; anterior width 1.04 times wider than posterior width; subquadrated, with thin and minute puncturing; side margin slightly archform curved, with round corner. Scutellum subquadrated. Elytra sharply reduced, ratio of width at elytral shoulder to length of elytra 1.00 : 1.22. Hind wing exposed behind elytra. Leg long; mid-femur strongly expanded; tibia without spur; all tarsal claws with tooth at basal part. Aedeagus (Fig. H) asymmetry; left paramere bent upward, with sharp end; right paramere expanded to posteriorly, with round end; median lobe expanded to posteriorly, with round end; tegumen prolonged to posteriorly; end of tegumen roundly expanded.

Female. Similar to male, but with darkened color comparing to male, blackish head, shorter antennae, less convex eye, and slender mid-femur.

Material examined. (3ex) GW- 1 ♂, 1 ♀, Mt. Gachilbong, Hongcheon, 21. VI. 1984; 1 ♀, Temple Baekdamsa, Mt. Seolak, Inje, 5. VI. 1979.

Distribution. Korea, Japan, and Russia (Isl. Kuril).

Remark. This species had been reported by a list of the Korean fauna without other information (Kwon *et al.*, 1996). So, we have redescribed for the Korean materials. This species is easily distinguished from the allies by the shape of mid-femur and the aedeagus.

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韓國產 병대벌레科 (딱정벌레目)의 分類學的 研究

I. Silinae, Malthininae, Chauliognathinae 亞科

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韓國產 병대벌레科는 Cantharinae와 Chauliognathinae의 2亞科만이 記錄되어 있었다. 그러나 이번 研究 結果, Silinae 亞科에 속하는 *Silis triimpressa* Pic와 Malthininae 亞科에 속하는 *Malthinus quadratipennis*, n. sp.와 *Malthinellus bicolor* Kiesenwetter가 확인되었기에 報告한다. 또한, Chauliognathinae 亞科는 *Trypherus niponicus* (Lewis)가 記錄되어 있지만, 國內에는 記載文이 없기에 再記載하였다. 이 報告書에서는 Cantharinae 亞科를 제외한 한국산 3亞科, Silinae, Malthininae, Chauliognathinae를 재정리하였다.

검색어 : 분류, 딱정벌레목, 딱정벌레과, Silinae, Malthininae, Chauliognathinae, 신종, 한국

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